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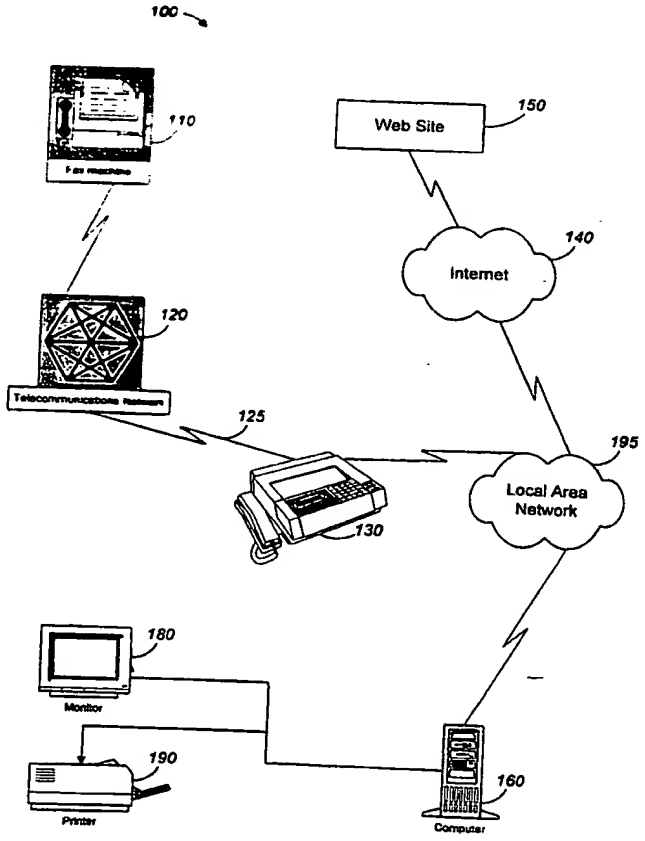
(54) Title: STORING ELECTRONICALLY TRANSMITTED FACSIMILES ON A WEB SITE

(57) Abstract

The invention features a method and apparatus for using a facsimile (fax) machine (130) which is compatible with the World Wide Web (WWW) to store faxes on a web site (150), from which the faxes can later be viewed and retrieved by users through a computer (160) with a monitor (180) and a printer (190). The web site (150) on which the web-compatible fax machine (130) stores faxes is uniquely associated with the fax machine (130). The web-compatible fax machine (130) converts faxes into an appropriate format before storing them on the web site (150). Optionally, the web site (150) may be password-protected to prevent unauthorized users from accessing stored faxes.



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Storing Electronically Transmitted Facsimiles on a Web Site

Background of the Invention

The invention relates to the storing of documents transmitted by facsimile on a World Wide Web site.

A conventional paper facsimile (fax) machine transmits a paper document by scanning the document, converting it into a digital format, and transmitting the digital version of the document across a telephone connection. A fax machine at the other end of the telephone connection receives the digital version of the document and uses it to print a facsimile of the original document on paper.

Another kind of conventional fax machine, typically referred to as a fax modem, is connected directly to an I/O port of a computer. A fax modem does not accept paper input; rather, it creates an electronic version of the document to be transmitted based on information stored in the computer's memory. Conventional fax modems are packaged with driver software which allows a user to "print" an electronic document to the fax modem, which then transmits the document in the same manner as a paper fax machine. The fax machine at the other end of the connection may be either a paper fax machine or another fax modem. If the receiving machine is a fax modem, the receiving fax modem and computer typically store and convert the transmitted data into a format that can be easily viewed or printed by a user, such as a GIF graphic file. Optical character recognition (OCR) software may also be used on the

receiving computer to translate the incoming transmission into characters or other tokens that can be directly manipulated by word processing or other software.

These conventional approaches to transmitting, receiving, and storing documents using fax machines require the user to be in the physical presence of either the sending or receiving machine to determine if a fax has been received. When using a conventional fax modem to receive fax transmissions, the receiving computer must be in the physical proximity of the receiving fax modem and must be connected to the receiving fax modem by a direct communications link.

Summary of the Invention

The present invention features a method and apparatus for using a fax machine which is compatible with the World Wide Web (WWW) to store incoming faxes on a web site, from which the status and content of such faxes can be viewed from any location by any user with access to the site. The invention has the advantage of allowing the user to determine if a fax has been received by monitoring a particular web site, without requiring that the user be in the physical proximity of the receiving fax machine. This is accomplished by posting incoming faxes or portions thereof to a web site which is associated with the receiving fax machine. The user may view and/or download posted faxes and other information from the site by use of a web browser over a company intranet, for example, without needing to be in the physical vicinity of the receiving fax machine.

The web-compatible fax machine may be configured to post to the appropriate web site either the entire contents of a received fax or just the cover page. The web site which is used to store faxes received by the

web-compatible fax machine may optionally be configured to limit user access by means of a password protection scheme. Faxes received using conventional fax machines can typically be viewed by anyone with physical access to the receiving fax machine. Using the web-compatible fax machine in conjunction with a password protection scheme can result in a higher level of transmission privacy and security than that obtained with conventional fax machines by limiting receipt of faxes to authorized users.

Brief Description of the Drawings

FIG. 1 shows a configuration of the web-compatible fax machine in conjunction with other related components.

FIG. 2 shows a side view of an embodiment of the web-compatible fax machine.

FIG. 3 is a diagram of the internal elements of an embodiment of the web-compatible fax machine.

FIG. 4 is a flow diagram of the main control logic of the web-compatible fax machine.

Detailed Description

FIG. 1 shows a web-compatible fax machine configured according to the invention. A web-compatible fax machine 130 is connected both to a telecommunications network 120 by a phone line 125 and to the Internet 140 via a Local Area Network 195 or by some other means.

The fax machine 130 then posts appropriate information about the fax to the web site 150 which is associated with the fax machine 130. Each web-compatible fax machine 130 always posts fax information to the web site 150 with which it is associated A 'web site' is identified by a Uniform Resource Locator (URL). In the case of a web-compatible fax machine 130 which also acts as an HTTP server, the web site 150 may be hosted

internally by the fax machine 130. The web site 150 may also be external to the fax machine 130, in which case the fax machine 130 and the web site 150 communicate using HTTP.

A computer 160 connected to the Internet 140 by a LAN 195 or some other means may access the web site 150 using conventional browser software. Optionally, the web site 150 may employ a password-protection scheme to limit access to authorized users. The computer is connected to a monitor 180 or other display device and a printer 190 or other output device. Any number of other computers may also be connected to the Internet 140 and access the stored information from the web site 150. A computer 160 may also be connected to a web-compatible fax machine 130 over a local area network (LAN) 195.

As shown in FIG. 2, a web-compatible fax machine 130 has an optional paper input tray 210 which is used to feed paper to an internal automatic document feed mechanism. The machine 130 also has an optional paper output tray 230 which can be used to print incoming faxes. The input tray 210 and output tray 230 allow the web-compatible fax machine 130 to be used in the same manner as a conventional fax machine.

The machine 130 also has an Ethernet connector 240 or other network connector by which the machine 130 can be connected to a LAN 195 or to a web server for access to the Internet 140. The machine 130 also has a fax phone input 250 and a modem phone input 260 which it can use to receive incoming faxes or data communications. The machine optionally contains an internal hard disk drive or other storage device 250 for storing incoming faxes. The machine also has an external front panel 240 by which a user can adjust various settings, such as the

desired external web site for incoming faxes, and what information should be stored on the web site 150 (e.g., the entire document or only the cover page). The web-compatible fax machine may also be configured remotely in response to HTTP and other commands. The web-compatible fax machine 130 has one or more processors 265 which it may use to convert faxes into formats appropriate for storage on a web site and to perform other tasks.

FIG. 3 illustrates a computer and computer elements suitable for implementing the invention. Referring to FIG. 3, the invention may be implemented in digital electronic circuitry or in computer hardware, firmware, software, or in combinations of them. Apparatus of the invention may be implemented in a computer program product tangibly embodied in a machine-readable storage device for execution by a computer processor; and method steps of the invention may be performed by a computer processor executing a program to perform functions of the invention by operating on input data and generating output. Suitable processors 265 include, by way of example, both general and special purpose microprocessors. Generally, a processor 265 will receive instructions and data from a read-only memory 271 and/or a random access memory 269 over a CPU bus 275. A computer can also receive programs and data from a storage medium such as an internal fixed hard disk 283 communicating through an appropriate interface 281 or a removable disk 279 communicating through an appropriate interface 277. Other storage devices suitable for tangibly embodying computer program instructions include all forms of non-volatile memory, including by way of example semiconductor memory devices, such as EPROM, EEPROM, and flash memory devices; magneto-optical disks;

and CD-ROM disks. A computer also contains an I/O bus 275 for communication among various I/O devices.

Any of the foregoing may be supplemented by, or incorporated in, specially-designed ASICs (application-specific integrated circuits). Input devices include a keyboard, mouse, tablet, stylus and pad, and control panel 287.

These elements will be found in a conventional desktop or workstation computer 160 as well as other computer equipment suitable for executing computer programs implementing the methods described here, which may be used in conjunction with any digital print engine or marking engine, display monitor or display panel 285, or other raster output device capable of producing color or gray scale pixels on paper, film, display screen, or other output medium.

FIG. 4 is a flow diagram representing the main control loop of the web-compatible fax machine 130. The control logic will typically be programmed in the machine 130 in firmware. Typically, the machine 130 is also programmed with an HTTP daemon and HTTP protocol stack, which are used to send and receive requests using the HTTP protocol over the Internet 140, and other network protocols which allow the machine 130 to be accessible from a remote workstation 160 over a LAN 195.

The machine 130 responds to an interrupt indicating that a fax is being received from a fax machine 110 over the telecommunications network 120 (step 310). When the fax has been received, it is stored in the machine's 130 local memory (step 330). The machine then stores the fax in a database containing information about each received fax, including their names, locations on disk, and other management information (step 335).

Next, the machine 130 converts the fax into a format appropriate for storage on a web site 150, such as Adobe Portable Document Format (PDF), described in Portable Document Format Reference Manual, Adobe Systems Incorporated, Addison-Wesley, 1993 (step 340). Then the machine 130 transfers the appropriate HTML code to the web site 150 with which it is associated, according to the user-set configuration parameters (step 350). Such data may include the fax cover page, the entire contents of the fax, or other information about the fax. The HTML code in which the data is contained will typically be embedded in the ROM of the fax machine. This HTML code defines the layout, style, and structure of the web pages associated with the fax machine. Minimally, each web-compatible fax machine will have associated with it a home page. The home page may represent an electronic 'in box', which lists all of the faxes received by the fax machine. The home page may also present a password challenge that the user must satisfy in order to gain access to a second page representing the electronic in box. More than one in box may be associated with a given device, for those instances where the fax machine is actually a fax server maintaining multiple incoming fax phone lines.

An electronic in-box page will typically contain thumbnail representations of each fax currently stored on the fax machine. The thumbnail is a reduced size representation of the first page of the fax. Password security may be implemented either at the home page level, the electronic in box level, or both. Each thumbnail image is associated with an HTML anchor which, when activated by a single click shows a full-size representation of the first page or a cover page of the

fax, and when activated by a double click causes the stored version of the fax to be downloaded to the user's web browser.

In the case of a fax machine 130 which serves as a host for its associated web site 150, the fax machine may generate HTML code and appropriate HTTP responses on the fly in response to user requests, instead of posting HTML code to the web site 150 prior to user requests.

After processing the incoming fax, the fax machine 130 may remain idle until another incoming fax is received (step 310). Although a single control loop is shown in FIG. 4, multiple invocations of the process shown in FIG. 4 may be run in parallel or interleaved with each other to better accommodate multiple incoming faxes.

After the incoming fax has been processed, a user may then use web browser software on a computer 160 connected to the Internet 140 over a LAN 195 or by other means to view the fax information on the web site 150. When the user points the web browser at the URL or IP address associated with the fax machine 130, an HTTP transaction request is generated by the user's web browser. In the case where the fax machine 130 is also an HTTP server, the HTTP transaction request is sent to the fax machine's HTTP daemon, which serves a reply to the query, generally in the form of an HTML page description.

Although elements of the invention are described in terms of a software implementation, the invention may be implemented in software, hardware, firmware, or any combination of them.

The present invention has been described in terms of an embodiment. The invention, however, is not limited

to the embodiment depicted and described. Rather, the scope of the invention is defined by the claims.

What is claimed is:

1. A method comprising:

receiving an electronic facsimile document;

converting the document into a format appropriate for storage at a web site identified by a Uniform Resource Locator;

identifying a destination web site by a Uniform Resource Locator;

selecting information from the document; and

making the selected information available to a user from the destination web site.

2. The method of claim 1, wherein:

the selected information about the document is selected with reference to a setting with one or more states.

3. The method of claim 2, wherein:

in one state of the setting, the selected information includes a first page of the document.

4. The method of claim 2, wherein:

in one state of the setting, the selected information is the entire content of the document.

5. The method of claim 1, wherein:

the electronic facsimile document is originally received on a machine that includes the destination web site.

6. The method of claim 1, wherein:

converting the document comprises converting the document into Adobe Portable Document Format.

7. The method of claim 1, further comprising:

preventing unauthorized access to the destination web site.

8. The method of claim 7, wherein:

preventing unauthorized access to the destination web site comprises using a password-protection scheme.

10. The method of claim 1, wherein:

the destination web site is on a computer on a network.

11. The method of claim 10, wherein:

the network comprises the Internet.

12. The method of claim 10, wherein:

the network comprises a local area network.

13. The method of claim 10, wherein:

the network comprises a wide area network.

14. The method of claim 10, wherein:

the electronic facsimile document is received by a facsimile machine configured to communicate over the network with the computer.

15. The method of claim 1, further comprising:

sending from the destination web site to a user information derived from the selected information in response to a request directed to the destination web site by the user.

16. The method of claim 15, wherein:

the information sent to the user comprises the selected information.

17. The method of claim 15, wherein:

the information sent to the user comprises a thumbnail of a first page of the facsimile document.

18. The method of claim 15, wherein:

the information sent to the user comprises a name of the document.

19. The method of claim 15, wherein:

the information sent to the user comprises a size of the document.

20. The method of claim 15, wherein:

the information sent to the user comprises a time of receipt of the document.

21. A method comprising:

receiving an electronic facsimile document;

converting the document into Adobe Portable Document Format;

identifying a destination location identified by a Uniform Resource Locator; and

making the document in Adobe Portable Document Format available to a user accessing the destination location.

22. A method comprising:

receiving an electronic facsimile document;

converting the document into a format appropriate for storage at a location identified by a Uniform Resource Locator;

selecting information from the document;

storing the selected information at a location identified by a Uniform Resource Locator; and

sending to a user information derived from the selected information in response to a request by the user.

23. The method of claim 22, wherein:

the selected information about the document is selected with reference to a setting with one or more states.

24. The method of claim 23, wherein:

in one state of the setting, the selected information includes a first page of the document.

25. The method of claim 23, wherein:

in one state of the setting, the selected information is the entire content of the document.

26. The method of claim 22, wherein:

sending the selected information to the user is performed by means of the HTTP protocol.

27. The method of claim 22, wherein:

converting the document comprises converting the document into Adobe Portable Document Format.

28. The method of claim 22, further comprising:

receiving authentication information from the user prior to receiving the user's request;

evaluating the authentication information; and

denying the user's request if the evaluation of the authentication information fails.

29. The method of claim 28, wherein:

the authentication information is a password.

30. The method of claim 22, wherein:

the information sent to the user comprises HTML page description information.

31. The method of claim 30, wherein:

the viewable page represented by the HTML page description information contains a first page of the facsimile document.

32. The method of claim 30, wherein:

the viewable page represented by the HTML page description information contains a name of the document.

33. The method of claim 30, wherein:

the viewable page represented by the HTML page description information contains a size of the document.

34. The method of claim 30, wherein:

the viewable page represented by the HTML page description information contains a time of receipt of the document.

35. A method comprising:

receiving an electronic facsimile document;

converting the document into Adobe Portable Document Format;

storing the document at a location identified by a Uniform Resource Locator; and

sending to a user the document in response to a request by the user.

36. An apparatus comprising:

means for receiving an electronic facsimile document;

means for converting the document into a format appropriate for storage at a location identified by a Uniform Resource Locator;

means for identifying a destination location identified by a Uniform Resource Locator;

selection means for selecting information about the document; and

transmission means for transmitting the selected information about the document to a requesting user.

37. The apparatus of claim 36, wherein:

the selection means selects information about the document with reference to a setting with one or more states.

38. The apparatus of claim 37, wherein:

in one state of the setting, the selected information includes a first page of the document.

39. The apparatus of claim 37, wherein:

in one state of the setting, the selected information is the entire content of the document.

40. The apparatus of claim 36, wherein:

the transmission means transmits the selected information by means of the HTTP protocol.

41. The apparatus of claim 36, wherein:

the conversion means converts the document into Adobe Portable Document Format.

42. The apparatus of claim 36, further comprising:

security means for preventing unauthorized access to the document.

43. The apparatus of claim 36, wherein:

the security means uses a password-protection scheme to prevent unauthorized access to the document.

44. The apparatus of claim 36, wherein:

the destination location is on a computer on a network.

45. The apparatus of claim 44, wherein:

the network comprises the Internet.

46. The apparatus of claim 44, wherein:

the network comprises a local area network.

47. The apparatus of claim 44, wherein:

the network comprises a wide area network.

48. The apparatus of claim 44, wherein:

the electronic facsimile document is received by a facsimile machine configured to communicate over the network with the computer.

49. An apparatus comprising:

means for receiving an electronic facsimile document; and

means for converting the document into Adobe Portable Document Format; and

means for identifying a destination web site identified by a Uniform Resource Locator; and

means for transmitting the document to the destination web site using the HTTP protocol.

50. An apparatus comprising:

means for receiving an electronic facsimile document;

means for converting the document into a format appropriate for storage at a location identified by a Uniform Resource Locator;

means for selecting information from the document;

means for storing the selected information at a location identified by a Uniform Resource Locator;

means for sending to a user information derived from the selected information in response to a request by the user.

51. The apparatus of claim 50, wherein:

the selection means selects information about the document with reference to a setting with one or more states.

52. The apparatus of claim 51, wherein:

in one state of the setting, the selected information includes a first page of the document.

53. The apparatus of claim 51, wherein:

in one state of the setting, the selected information is the entire content of the document.

54. The apparatus of claim 50, wherein:

sending the selected information to the user is performed by means of the HTTP protocol.

55. The apparatus of claim 50, wherein:

the conversion means converts the document into Adobe Portable Document Format.

56. The apparatus of claim 50, further comprising:

means for receiving authentication information from the user prior to receiving the user's request;

means for evaluating the authentication information; and

means for denying the user's request if the evaluation of the authentication information fails.

57. The apparatus of claim 56, wherein:

the authentication information is a password.

58. The apparatus of claim 50, wherein:

the information sent to the user comprises HTML page description information.

59. The apparatus of claim 58, wherein:

the viewable page represented by the HTML page description information includes a thumbnail of a first page of the facsimile document.

60. The apparatus of claim 58, wherein:

the viewable page represented by the HTML page description information contains a name of the document.

61. The apparatus of claim 58, wherein:

the viewable page represented by the HTML page description information contains a size of the document.

62. The apparatus of claim 58, wherein:

the viewable page represented by the HTML page description information contains a time of receipt of the document.

63. An apparatus comprising:

means for receiving an electronic facsimile document in a web-compatible facsimile machine;

means for converting the document into Adobe Portable Document Format;

means for storing the document in the web-compatible facsimile machine at a location identified by a Uniform Resource Locator; and

means for sending to a user the document in response to a request by the user.

FIG. 1

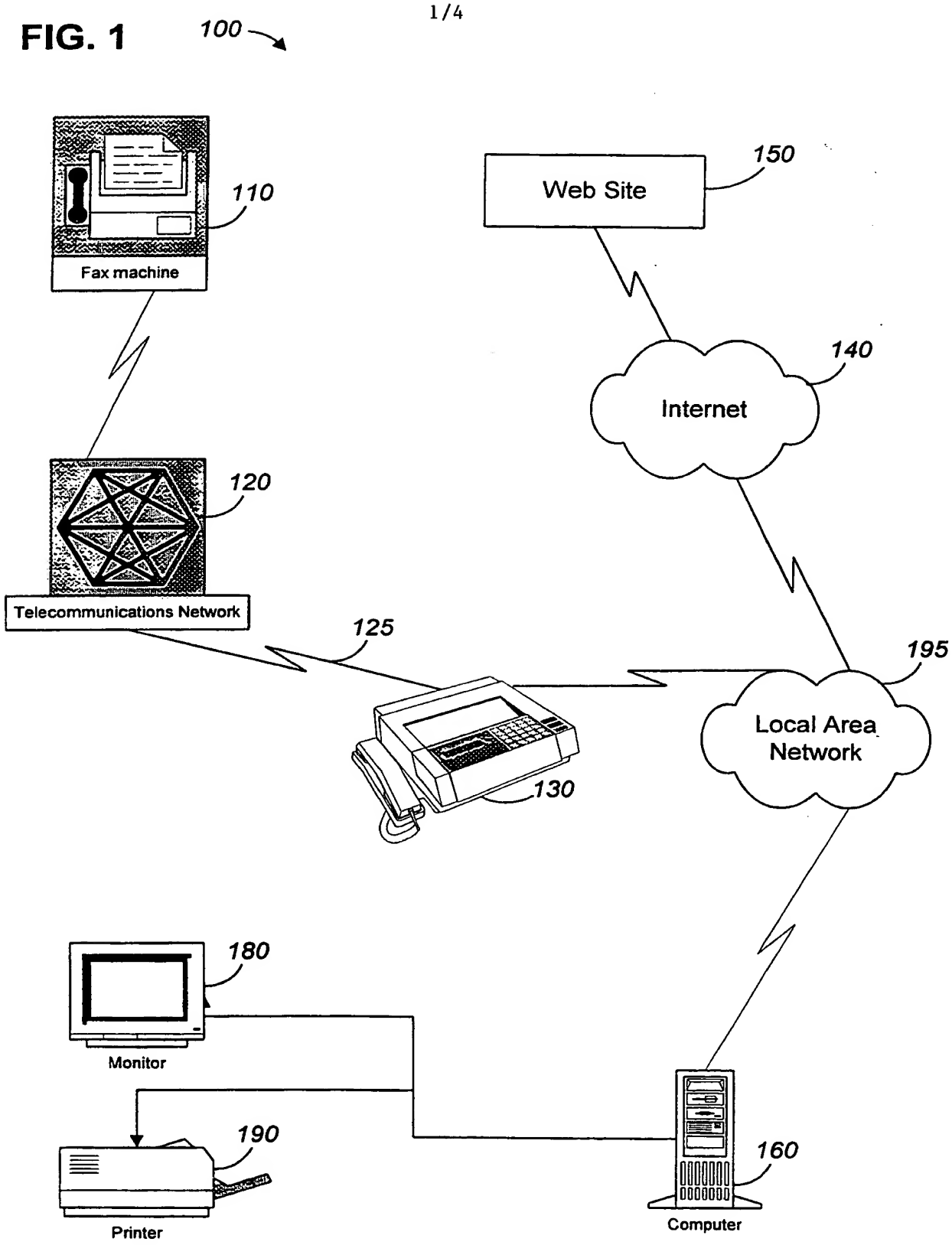

100
110
Fax machine
150
Web Site
140
Internet
120
Telecommunications Network
125
195
Local Area Network
130
180
Monitor
190
Printer
160
Computer

FIG. 2

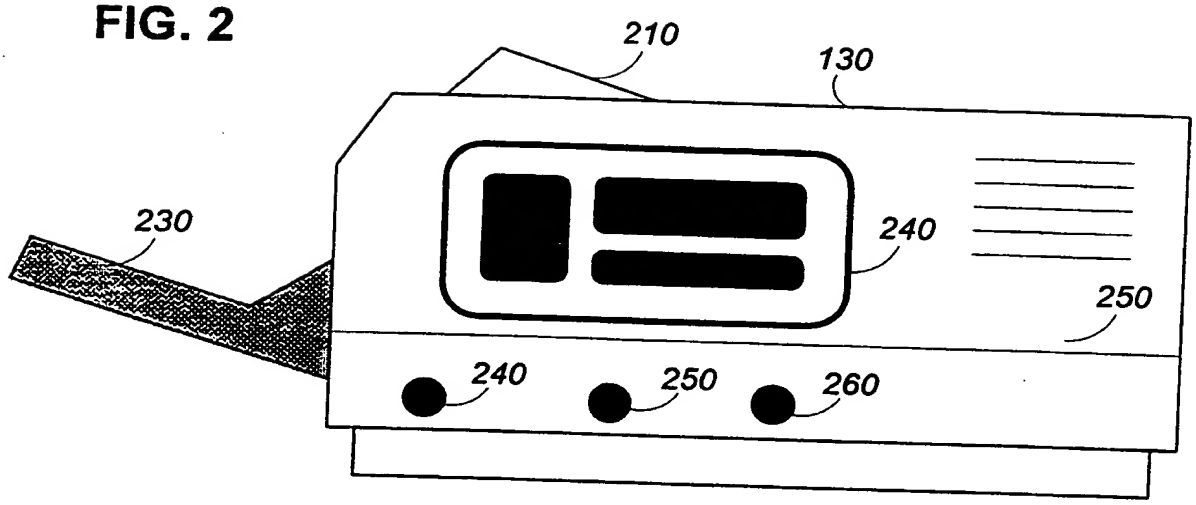


FIG. 3

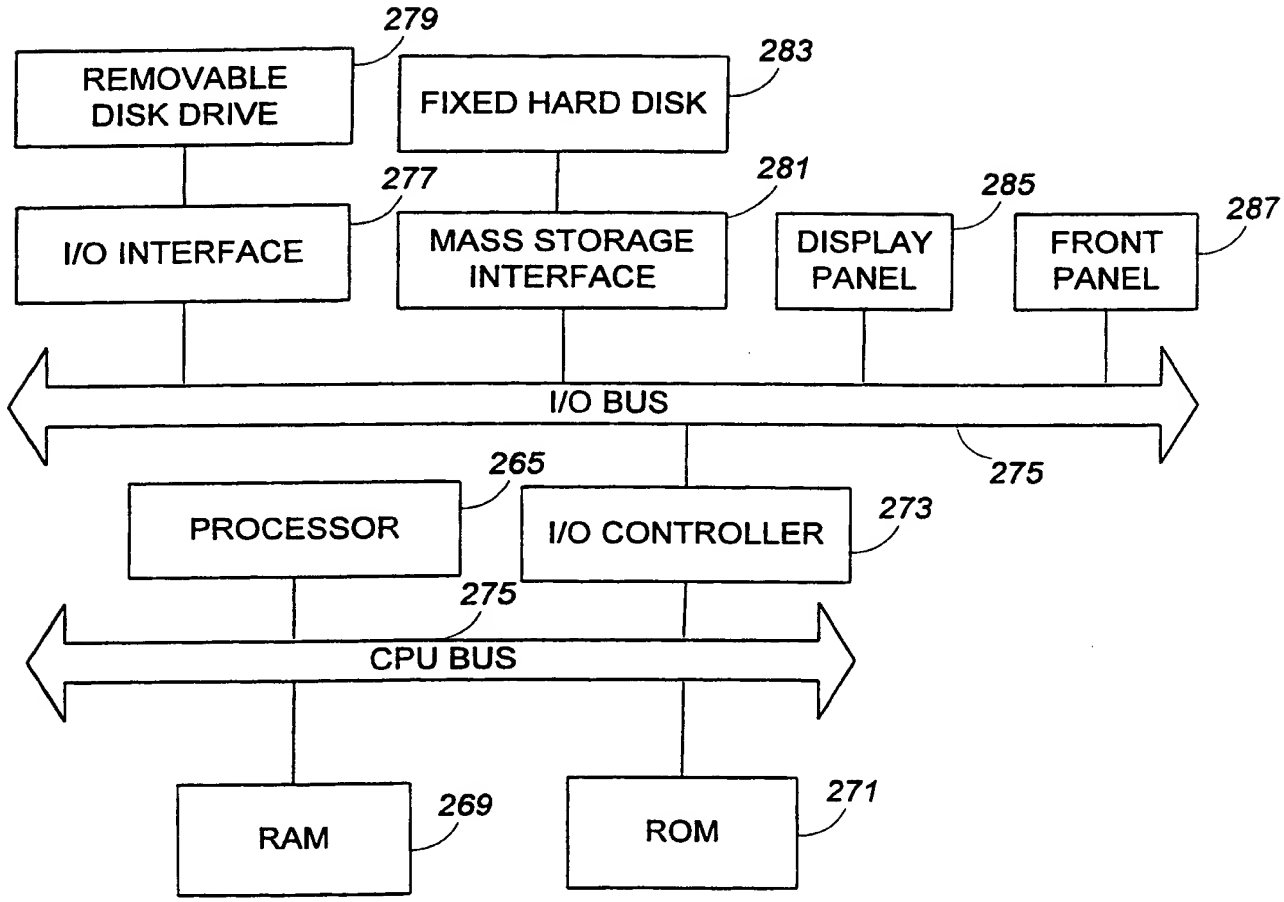
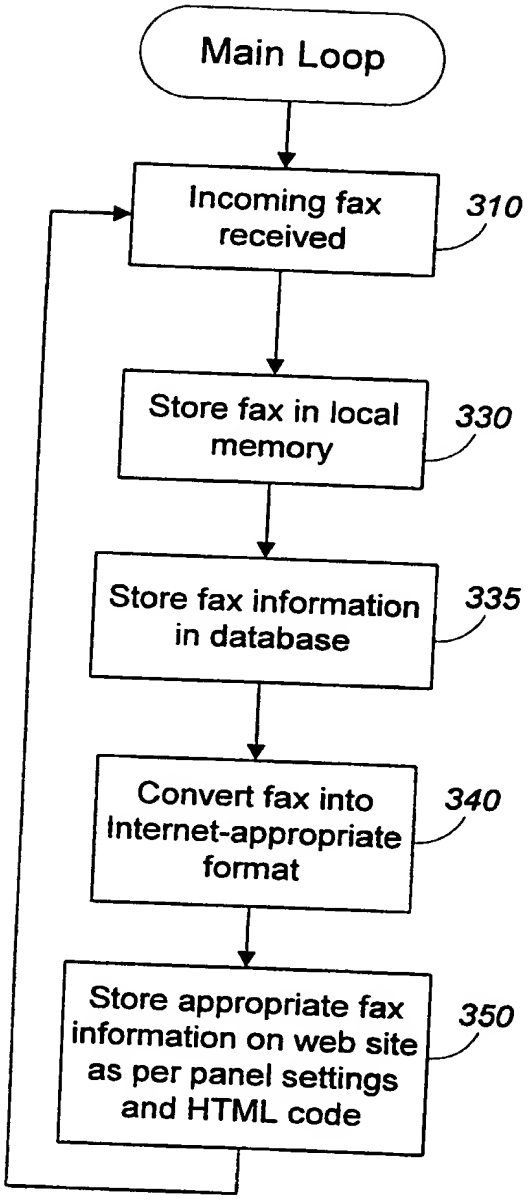

279
REMOVABLE DISK DRIVE
283
FIXED HARD DISK
277
I/O INTERFACE
281
MASS STORAGE INTERFACE
285
DISPLAY PANEL
287
FRONT PANEL
I/O BUS
275
265
PROCESSOR
I/O CONTROLLER
273
275
CPU BUS
RAM
269
ROM
271

FIG. 4


Main Loop
Incoming fax received
310
Store fax in local memory
330
Store fax information in database
335
Convert fax into Internet-appropriate format
340
Store appropriate fax information on web site as per panel settings and HTML code
350

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/12515

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04N 1/00; G06F 15/16
US CL :358/402, 403, 444; 395/200.36
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 358/400, 402, 403, 404, 443, 444; 395/200.31, 200.36, 200.43, 200.47, 200.48, 200.49, 200.74; 379/93.24, 100.01

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS
search terms: facsimile, fax, internet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---- Y	US 5,675,507 A (BOBO II) 07 October 1997, column 6, line 33 through column 12, line 62, and column 16, line 24 through column 20, line 5.	1-8, 10-13, 15-47, 49-62 ---------- 14, 48, 63
X, P ----- Y, P	US 5,790,790 A (SMITH et al) 04 August 1998, column 3, line 15 through column 6, line 63, column 9, line 10 through column column 11, line 4, and column 13, line 17 through column 14, line 4.	1-8, 10-13, 15-47, 49-62 ---------- 14, 48, 63
Y, P	US 5,812,278 (TOYODA et al) 22 September 1998, column 19, line 51 through column 21, line 59.	14, 48, 63
A, P	US 5,761,663 A (LAGARDE et al) 02 June 1998, column 4, line 45 through column 7, line 45.	1, 21, 22, 36, 49, 50, 63

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 DECEMBER 1998	26 FEB 1999
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Form PCT/ISA/210 (second sheet)(July 1992)★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/12515

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,608,786 A (GORDON) 04 March 1997, column 2, line 25 through column 3, line 63.	1, 21, 22, 35, 36, 49, 50, 63
A, P	JP 10-150,462 A (WAKABAYASHI) 02 June 1998, Abstract.	1, 21, 22, 35, 36, 49, 50, 63
A, P	JP 10-107,836 A (SHIMIZU) 24 April 1998, Abstract.	1, 21, 22, 35, 36, 49, 50, 63

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